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32. (original) A method according to Claim 25 further comprising measuring the temperature of the friction stir welding tool.

33. (original) A method according to Claim 32 further comprising automatically modifying the heat output of the at least one heater to thereby modify the temperature of the friction stir welding tool.

#### **REMARKS/ARGUMENTS**

Applicant thanks the Examiner for the courtesies extended to the undersigned during the telephonic interviews on March 22, 23, and 24, 2004. As discussed during the interviews on March 23 and 24, Applicant has amended independent Claim 1 to more clearly define the invention, as explained more fully below. Applicant requests reconsideration of Claims 1-15 in view of the Amendments and Remarks set forth herein, which Applicant considers to be a summary of the matters discussed during the interviews.

#### **The Rejections Directed to Claims 1-3 Are Overcome**

The Office Action rejected Claims 1 and 3 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,554,175 to Thompson. The Office Action also rejected Claim 2 under 35 U.S.C. § 103(a) over the Thompson '175 patent in view of U.S. Patent No. 6,168,067 to Waldron et al.

During the interviews on March 23 and 24, it was discussed that the Thompson '175 patent discloses electrically preheating the pin tool 181 and shoulder tool 189 to weld temperature in order to mitigate the thermal expansion of the pin tool and mechanism during the weld start transient. It was discussed that the Larsson '411 application discloses supplying the body and/or pin with extra heat during and/or after the welding operation to prevent the body and pin from being permanently bonded to one another by the plasticized material that forms during the welding operation. However, it was discussed that neither the Thompson '175 patent nor Larsson '411 application disclose using friction stir welding to join precipitation hardened structural members. Regarding the Waldron '067 patent, it was discussed that Waldron discloses

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friction stir welding structural members that are in a non-equilibrium state, *i.e.*, after being solution heat treated at a first predetermined temperature schedule, but before being precipitation heat treated at a second predetermined temperature schedule. It was further discussed that U.S. Patent No. 6,398,883 to Forrest et al. is commonly owned by The Boeing Company and, thus, is not a proper reference under § 103.

Applicant has amended independent Claim 1 to emphasize that the friction stir weld joint is formed subsequent to the first and second structural members being precipitation hardened. This is particularly advantageous since it provides a precipitation hardened structural assembly having a friction stir weld joint comprising a refined grain structure having substantially no residual strain so as to inhibit grain growth during post-weld heat treatments. In addition, unlike the structural assemblies disclosed in Waldron, the first and second structural members are precipitation hardened prior to formation of the friction stir weld joint, which can be more economical than forming the friction stir weld joint after the solution heat treatment, but before the precipitation heat treatment. Accordingly, Applicant submits that independent Claim 1, and the claims depending therefrom, as clarified by the above-referenced amendment, include recitations that patentably distinguish the claimed invention over the cited references.

**The Rejections Directed to Claims 4-6 and 9-12 Are Overcome**

The Office Action rejected Claims 9 and 12 under 35 U.S.C. § 102(b) as being anticipated by PCT Publication No. WO98/51441 to Larsson. The Office Action also rejected Claims 4-6 and 10-11 under 35 U.S.C. § 103(a) over the Thompson '175 patent in view of the Larson '441 application.

During the interview on March 22, 2004, it was discussed that the Larsson '411 application discloses supplying the body and/or pin with extra heat during and/or after the welding operation to prevent the body and pin from being permanently bonded to one another by the plasticized material that forms during the welding operation. It was discussed that the Thompson '175 patent discloses electrically preheating the pin tool 181 and shoulder tool 189 to weld temperature in order to mitigate the thermal expansion of the pin tool and mechanism

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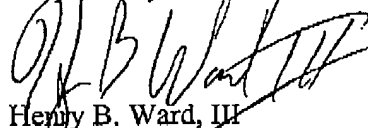
during the weld start transient. However, it was also discussed that the only source of such heat disclosed in the Larsson application is the process referred to as the pumping effect, *i.e.*, the flow of the frictional heat generated during friction stir welding in the longitudinal direction of the pin. Similarly, it was also discussed that the Thompson '175 patent does not disclose how the pin tool and shoulder tool are electrically preheated nor does the Thompson patent disclose electrically insulating the heater from the structural assembly being welded. Accordingly, it was agreed during the interview that independent Claims 4 and 9, and the claims depending therefrom, include recitations that patentably distinguish the claimed invention over the cited references.

### CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that Claims 1-33 of the present application are in condition for allowance. It is respectfully requested that a Notice of Allowance be issued in due course. Examiner Stoner is encouraged to contact Applicant's undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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